Physician contributions to nonmedical science: Davidson Black, our Peking man

W.E. SWINTON

On Wednesday Oct. 20, 1976 a bronze plaque to Davidson Black was unveiled by his son in the foyer of the medical sciences building of the University of Toronto. There was a small group of interested observers presided over by Dr. John Evans, president of the university and Professor Maurice Careless, the distinguished historian. Anthropologists, anatomists and neurologists were there but there was also evidence that the man who was being honoured, more than 40 years after his death, was little known.

The attractive plaque is simple and gives emphasis to the anthropologist in two languages. But how can a sentence or two convey anything of the vibrant man, a true product of Canada, who became internationally famous and whose family is notable in the university and city of Toronto?

Davidson Black was born on July 25, 1884 in St. Vincent Street, Toronto. Both house and street have disappeared in the city's development.

His father was an eminent Queen's Counsel who probably passed on some of his analytical qualities to the son; his mother gave him a tenacity that sent him far and wide in the search for truth. The father died aged 49, so the boy, like some other great doctors, seems to have depended largely on his mother for guidance and sympathy in his early education. After a time in a rather special school, Davidson Black entered Harbord Street Collegiate, then as now an excellent educational base. Here his natural history interests were further stimulated by a wise principal, Dr. Spotton, and the city was still small enough to provide a splendid background of ravines and rivers, besides the lakeshore and the island, in which a naturalist could roam. Excursions, whether singly or in groups, were not without their dangers, and on one of them Davidson got such a drenching that an illness, diagnosed as rheumatic fever, developed; he spent most of his 14th year in bed.

This unhappy and discouraging event did, however, have a happy ending. He recovered well, and the long association with his physician, Dr. Strange, turned the boy toward medical studies. Whether consciously or not, he also turned to ardent summer work — perhaps as a restorative; it was certainly a toughening experience. As a student at high-school and the university he worked in mining and lumber camps. He was certainly employed by the Hudson's Bay Company, and he is said to have prospected for gold. He thus developed a self-assurance and ability to look after himself that was to be strangely appropriate to the life he was to lead many years afterward.

Davidson Black

He had adventures on land and in the water. There is a story that he saved his life during a forest fire by standing for a day in a lake.

He was always anxious to learn from the Indians, and he became especially friendly with the Ojibways, who liked him well enough to give him a nick name — "little white muskrat". He seems during all this formative time to have recorded his adventures only to his mother, and unfortunately none of his letters survive. He also had much guidance from a Toronto naturalist, J. Henry Fleming, whose collections are now in the Royal Ontario Museum.

In 1903 young Black entered the University of Toronto as a medical student. It is interesting to note that he was not regarded as a very brilliant student, but he performed his duties satisfactorily and was duly qualified in 1906.

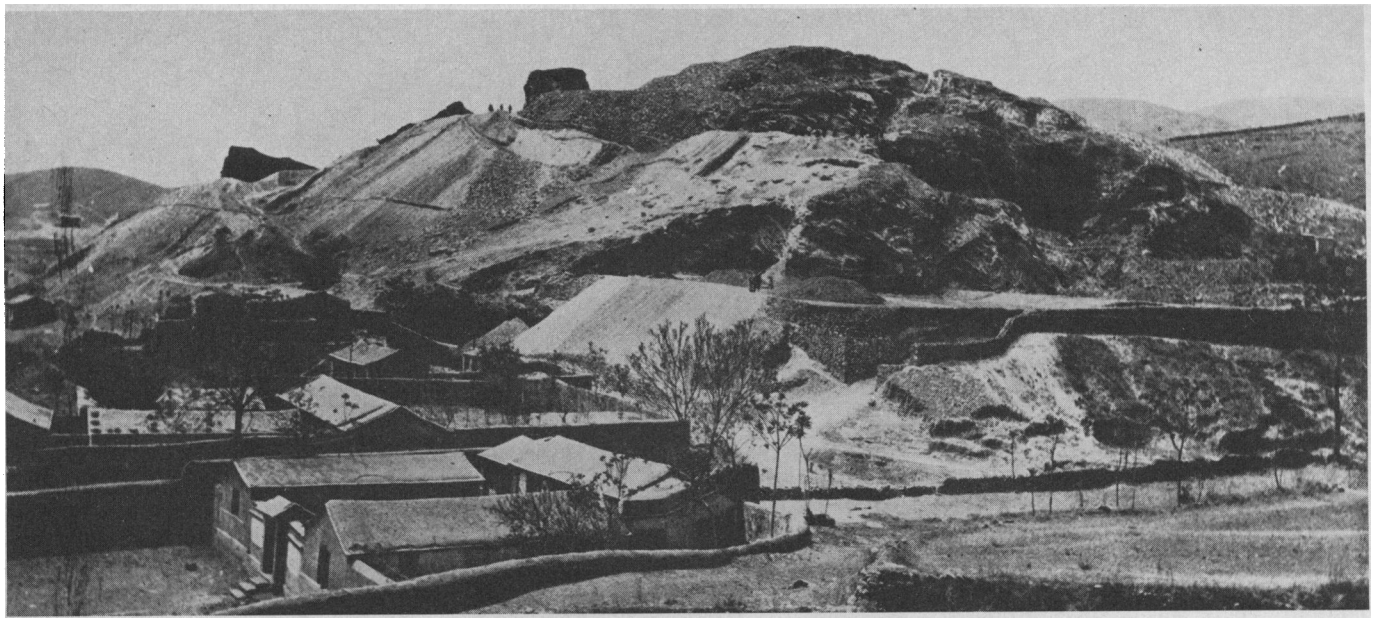
His conduct then was unusual, for he was recommended to spend another 3 years taking an arts degree to broaden his mind. There is some report that he used part of this time to study comparative anatomy, and it would have been an unusually good time to do so. At any rate, when he graduated again he was certainly well qualified for the role that, all unknown to him, he was to play.

In 1909 he went as assistant to the anatomy department at Western Reserve University, Cleveland. Here he was fortunate in being under the tutelage of brilliant professors, and once again he employed his summers vigorously, now in laboratories and other educational institutions. Some of this time was spent with the Geological Survey of Canada, and this impressed him with the validity of fossils in the history of evolution and the value of geological time.

Dr. Black spent much of his official time in studies on neuroanatomy. His

CMAJ **continues the series by Dr. Swinton on distinguished physicians who have contributed to nonmedical science. Sponsors of the articles are Associated Medical Services, Inc. and the Hannah Institute for the History of Medical and Related Sciences.**

Science and Art is a department of *CMAJ* **that presents medicine in relation to the humanities; readers' contributions, literary, serious and humorous, are welcomed.**



Site of the Sinanthropus cave deposit found in 1932 in the Chou-K'ou-Tien foothills

salary at Cleveland was only $1500 a year, so other thoughts were perhaps not much in his mind. However in 1913 he was appointed an assistant professor, and shortly afterwards he married Adena Nevitt, daughter of a remarkable medical man, Dr. Barrington Nevitt. Appropriately the wedding was at St. Luke's Church, Toronto.

Davidson Black had now a more comfortable home base in which he could study and entertain. In 1914 he had 6 months' leave. Acting on his chief's advice, he went to Manchester in England where Grafton Elliot Smith had been reorganizing the anatomy department. This experience, as the recently unveiled plaque in Toronto indicates, was a turning point in Davidson Black's life.

The young neuroanatomist was astonished and delighted at Elliot Smith's depth of analysis and the width of his observations. Anatomy, comparative anatomy and anthropology, both physical and social, were but part of the department's scope. Egyptian mummies inspired the professor to search for the arts and the philosophies that lay behind mummification and ritual dehydration. Black became infected by all this and turned towards anthropology. Furthermore, since the year was one in which the excavators of the bones and artifacts that were to be associated with Piltdown Man were at work, Black and Elliot Smith visited the site in Sussex and the department in the British Museum (natural history) in London where Smith Woodward was studying the materials and where Frank Barlow was busy making the plaster casts that were widely distributed to anatomists, dentists and anthropologists. The question is often asked why such famous anatomists were misled by the materials that later turned out to be "planted" for the enthusiastic discoverers. The answer is that the materials were all genuine — only their association with each other and the environment was false. The anatomists were mainly interested in the restoration of the skull and the estimation of its brain capacity, and they were working on plaster casts. There is evidence to show that neither of the famous anatomists, Elliot Smith and Arthur Keith, had the chance of studying the originals in any detail. Sir Arthur Keith said many years later that he only saw the originals in Smith Woodward's study in the faint light of a winter afternoon.

Davidson Black was not then to know that the Piltdown enterprise was a fool's errand. To him the experience was real. He became excited about the antiquity of man and the mechanics of its investigation. He applied himself now in Manchester to the study of Elliot Smith's ancient material and to practice in making plaster casts.

Meantime the professorship of anatomy at Otago, New Zealand, had become vacant and Elliot Smith was sponsoring his new disciple for the job. Fortunately several things conspired to concentrate Black's mind on another geographical direction. In 1915 W.D. Matthew, of the American Museum of Natural History, New York, a professor at Columbia University, published a book, "Climate and Evolution", based on his extensive studies on fossil mammals. Matthew, son of a Canadian paleontologist, had been born in New Brunswick. The book led Black to believe that the origin of man might be in Asia, and the offer of professorships in other parts of the world had thus to be denied.

In the summer and fall of 1914, Black had ventured to Holland and had formed a friendship with an anatomist there. He had returned to Canada late in August and had been enlisted as a captain in the Canadian Medical Corps. He saw service in Canada and in England, but without neglecting his military duties his mind was still on man, his origin and the possible site of this in China.

Suddenly the opportunity came. The Rockefeller Foundation had financed a college in China — the Peking Union Medical College. One of Black's associates had been appointed to the staff, and he asked Black to be his assistant. The way was now clear, just at the time of the armistice in November 1918, for Davidson Black to be a professor — not of anatomy or anthropology, but of neurology and embryology — and to be in China. The financing of the college was generous, and the intent was to make a college to be used for China and the Chinese for years to come. But China was politically in disorder, though the extent of this could not be seen in 1918.

The early years of the college were hard-working ones. He had his teaching, the occasional scientific paper in either neuroanatomy or paleontology. The college had been functioning 2 years before the formal opening took place. Then in 1924, after one or two expeditions to geological sites, Black was appointed professor of anatomy and had a new department to organize. This was fortunate for all, because 2 years earlier he had been invited back to Toronto to the department there, a tempting proposition as regards salary for a man with a family.

In the early 20s of this century paleontology was already making headlines from discoveries that American

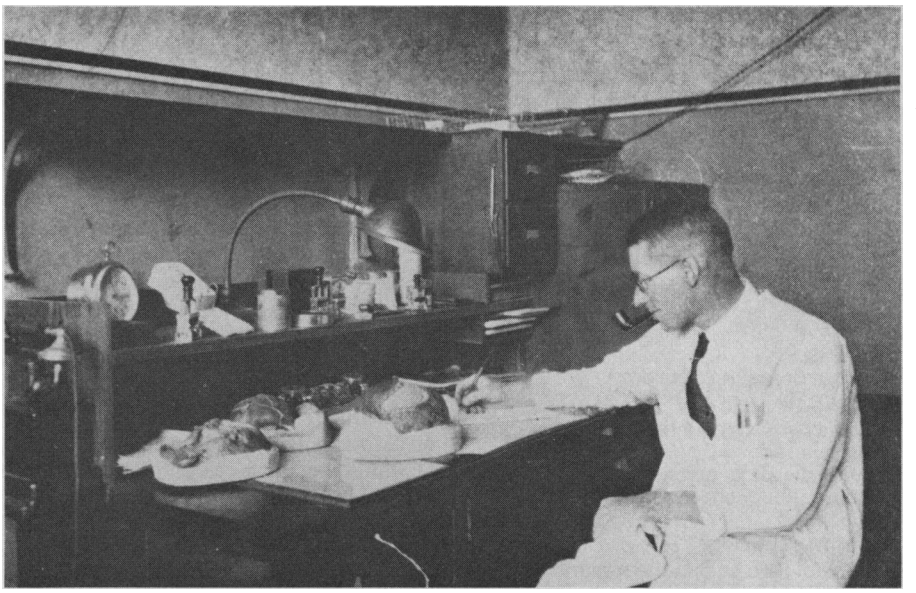
and Swedish expeditions were making. The discoveries of dinosaurs and their fossilized eggs in the Gobi Desert will be recalled. The Swedes had dinosaurian and other collections sent for examination to Uppsala, where some of them still are. In October 1926, at a meeting at the Peking Union Medical College in which international speakers took part, the startling announcement was made that an apparently human molar had been found at Chou-K'ou-Tien (variously spelled) and that a premolar had also been found there and sent to Uppsala. It was suggested that Dr. Davidson Black and the Chinese Geological Survey should investigate the site.

The two molars were handed over to Davidson Black but A.W. Grabau of the Geological Survey had already dubbed them "Peking Man", a title often supposed to have been created by Black. What he did was to examine them in great detail and decide that they were human. With this decision, he wrote a notice on "Tertiary Man in Asia: The Chou-K'ou-Tien Discovery", to *Nature* in London (November 1926) and *Science* in Washington (December 1926). From these his scientific name *Sinanthropus pekinensis* stems. Translated, this is "the Chinese man of Peking" which is, of course, also Peking Man.

Chou-K'ou-Tien is a village, 50 km from Peking, backed by limestone hills in which there is a large cave that had long been known for its fossil contents, though the bones were powdered for sale as Chinese medicine. Now the bones would be studied meticulously; in fact the work continued from 1927 to 1929. Among the greatest treasures of the mass of fractured bones in the cave was a skull heavily encrusted in matrix. Davidson Black cleaned this and cast the fossil skull. Its bones were thick with a low sloping forehead. Massive brow ridges were above the eye sockets. The skull was more complete than the earlier discovery of man from Java, and Black estimated the cranial capacity at 1000 cc.

The Chou-K'ou-Tien material was all embedded in massive layers on the floor of the cave to a thickness of nearly 50 m. Here in 10 years' work, 14 skulls, 14 lower jaws, parts of 45 different individuals, including some children, and 150 teeth were discovered.

The cave had long been occupied by man and beast. The men and their families would shelter there and then leave, or be dispossessed by animals (all kinds of animals, even elephants, are represented by bone) but then men would take over again — men with hunting skills (deer being the commonest prey) who had fire and could cook their venison. Today, after all the discoveries, and with the radioactive dating methods, *Sinanthropus* has been dated as living half a million years ago. But he has been equated with the East Indies *Pithecanthropus erectus* and is now known scientifically as *Homo erectus;* primitive man but Man!



Black at work in the laboratory of the anatomy building, Peking Union medical college. The college operated on a "charter" granted by a Canadian Act of Parliament — a gesture of dubious legality, insofar as Parliament has no authority to legislate education. None the less, only last year a graduate wrote CMA demanding the right to practise in Canada with his "Canadian" degree!

For Davidson Black the story could not be so complete. He is said to have worn the first tooth in a gold locket on his watch chain, but as a type-specimen it could hardly remain there. In 1928, when he was known as an enterprising and highly competent anatomist and anthropologist, he came back for a spell to Toronto to work on his finds and his theories. He had an apartment on St. George Street. He was busy and he was comfortable, but he felt that his work was unknown in Canada. He lectured to the Royal Canadian Institute but largely to an academic audience, and even then his talk was said to be "unimpressive".

At this time he received notice that his college had given him 3 years' leave to conduct a central Asian expedition, but for financial reasons this field trip never took place. As some compensation he was, however, able to found and organize the central cenozoic laboratory for the study of such bones as would be discovered of this geological age, and his research was amply supported by the Rockefeller Foundation. Here he was supported by an excellent staff of very capable Chinese scientists and with Teilhard de Chardin as an adviser.

In 1929 he attended and addressed the fourth pacific science congress at Bandoeng, meeting once more his old friend Elliot Smith. Together they visited the original Java site at which Dubois had found *Pithecanthropus* and later they saw the home of Peking Man.

Work, honours and acclaim were his for the successive years. The famous came to see him, he was elected to the Royal Society, he toured the near east and came home again to Canada. He gave the Croonian lecture to the Royal Society, with acceptance. Finds continued to be made and he worked on. On Mar. 15, 1934 he went to work as usual and spoke to a distinguished colleague (Dr. C.C. Young) of his continuing hopes for the centre. He worked on into the evening, when they found him dead at his desk of a heart ailment. As for the collections so richly increased later, they all disappeared in 1941 and have remained lost — one of the great unsolved mysteries of our time. On Nov. 8, 1945 a staff geologist with the US Army was able to report "the recovery of a collection of bones and artifacts from the site at Chou-K'ou-Tien. Also the original records of Davidson Black's research there." They were found in Tokyo University and were to be returned to the college. Alas, the college itself faced an uncertain future and with the advance of the communists Rockefeller's support inevitably ceased.

Davidson Black must be remembered as a scientist, scholar and, especially, as a man without bias as to class or race. To him the facts of nature mattered, not the nature of their discoverers. ■